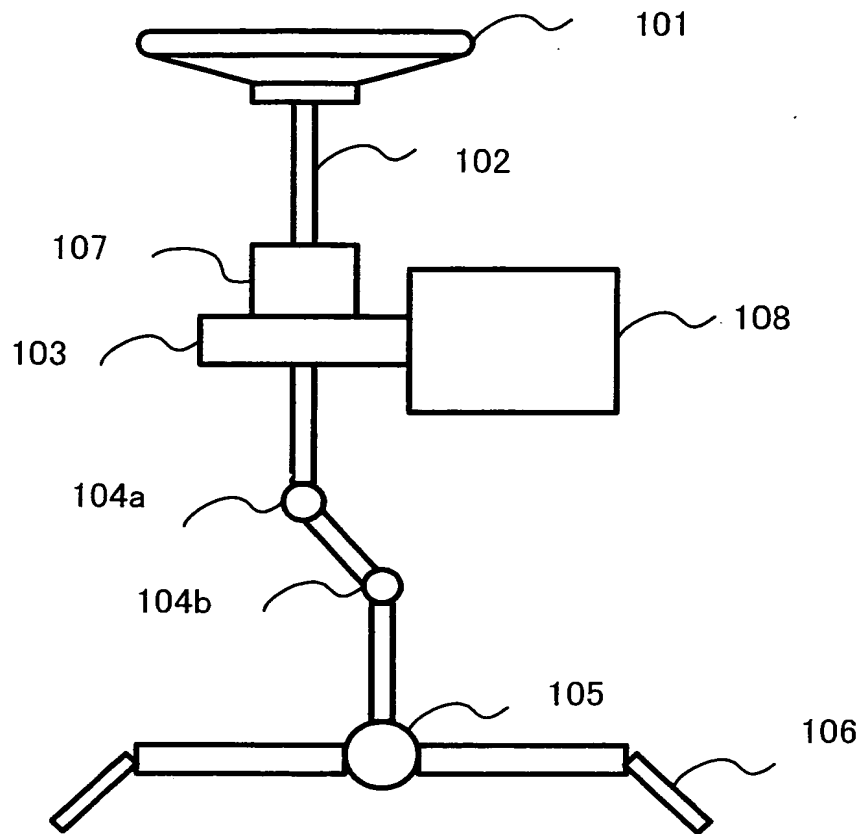


FIG.1



1/17

FIG.2

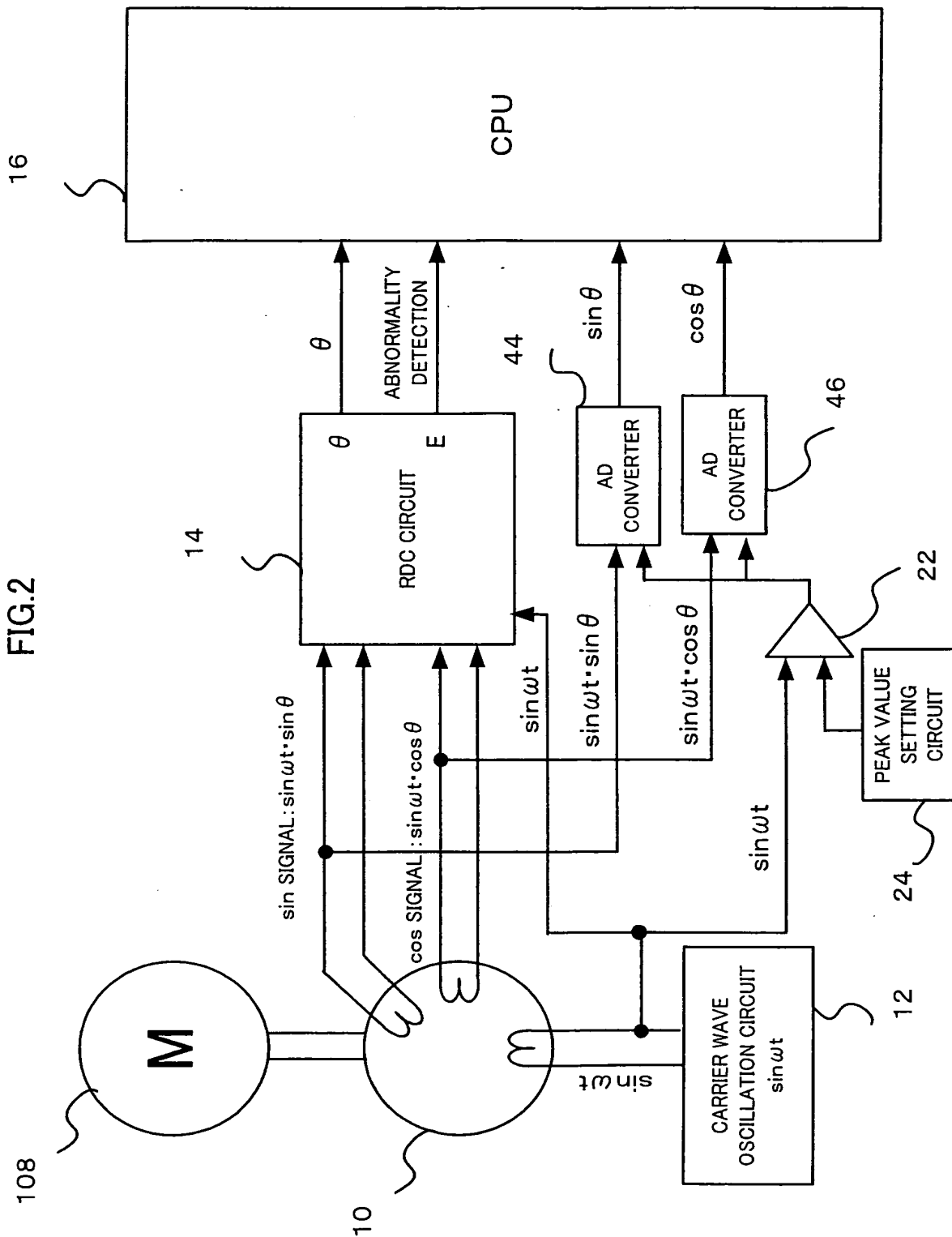


FIG.3

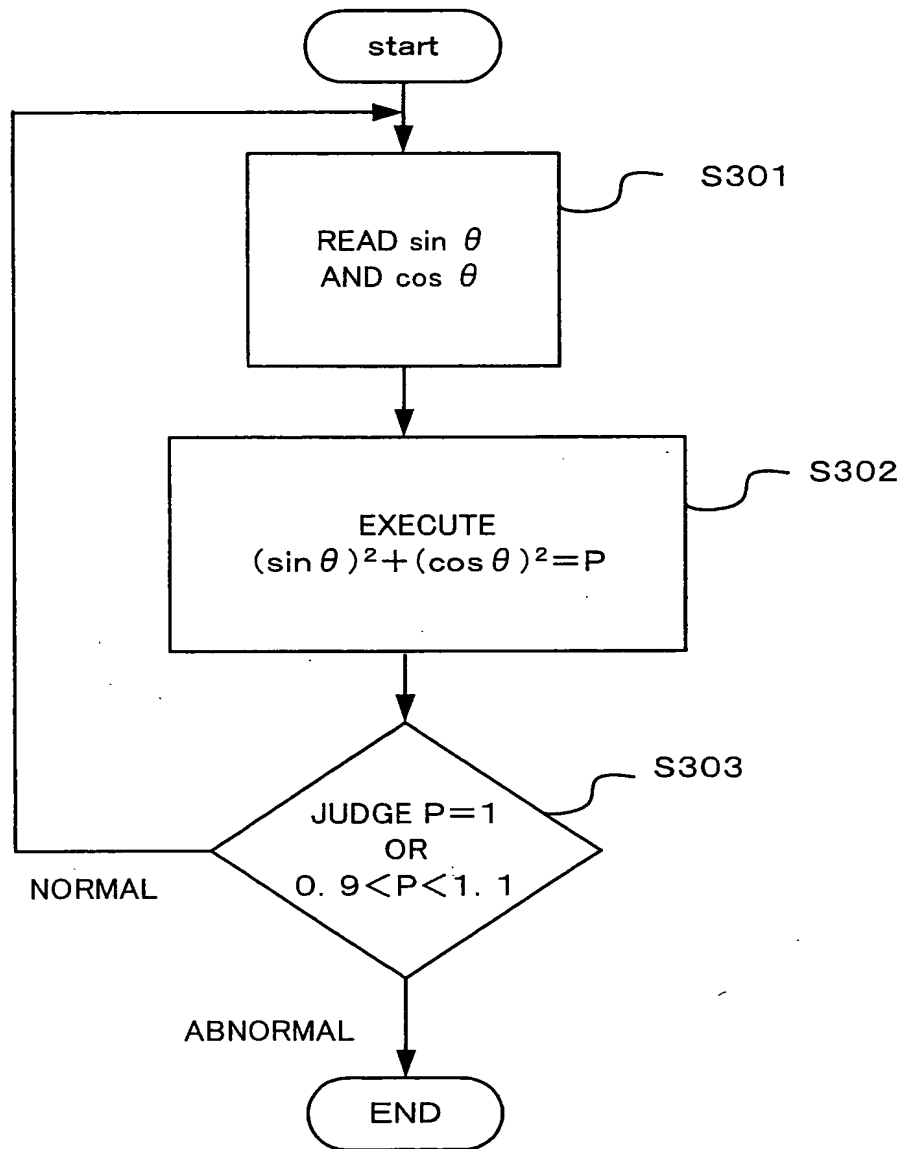


FIG.4

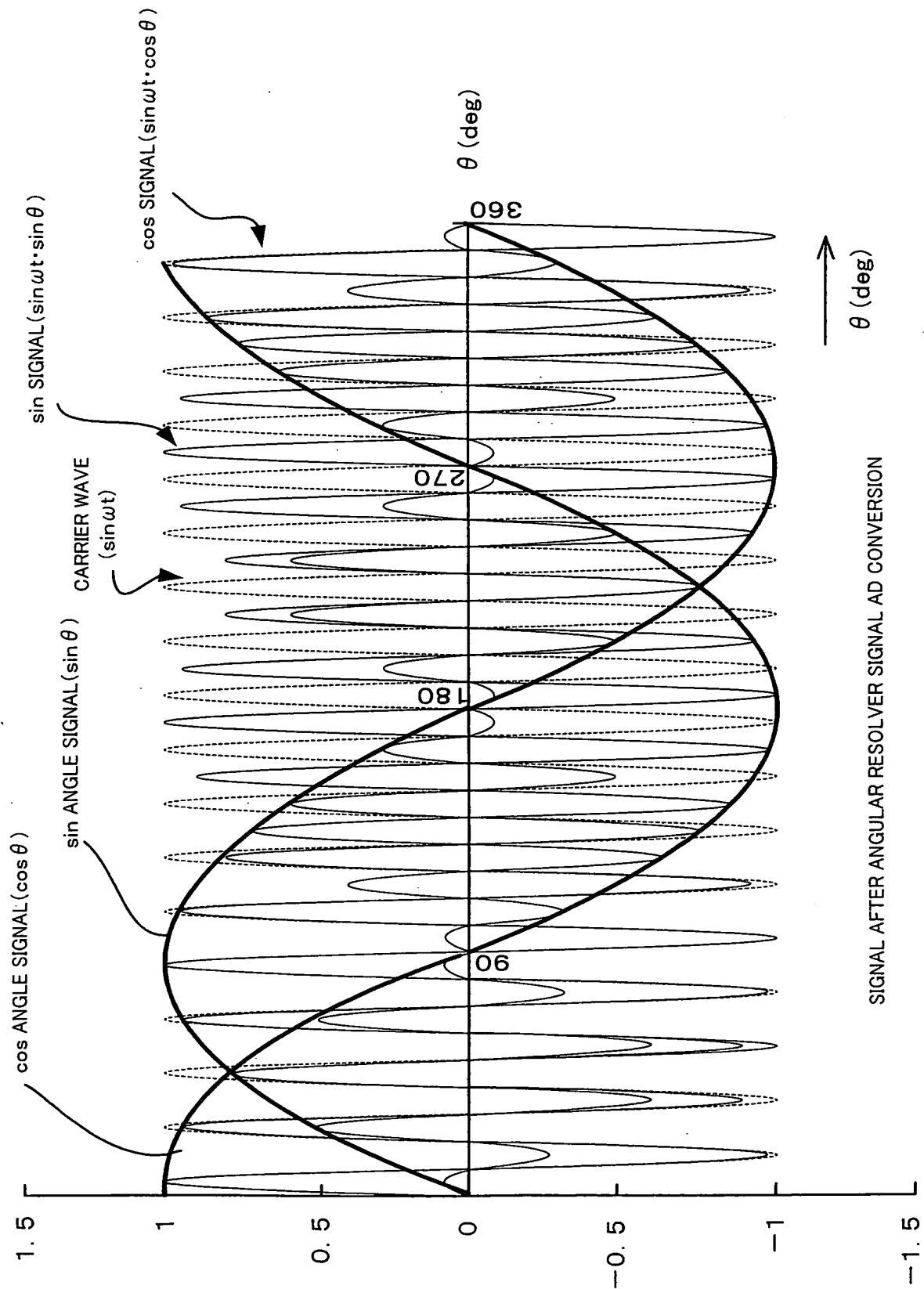


FIG.5

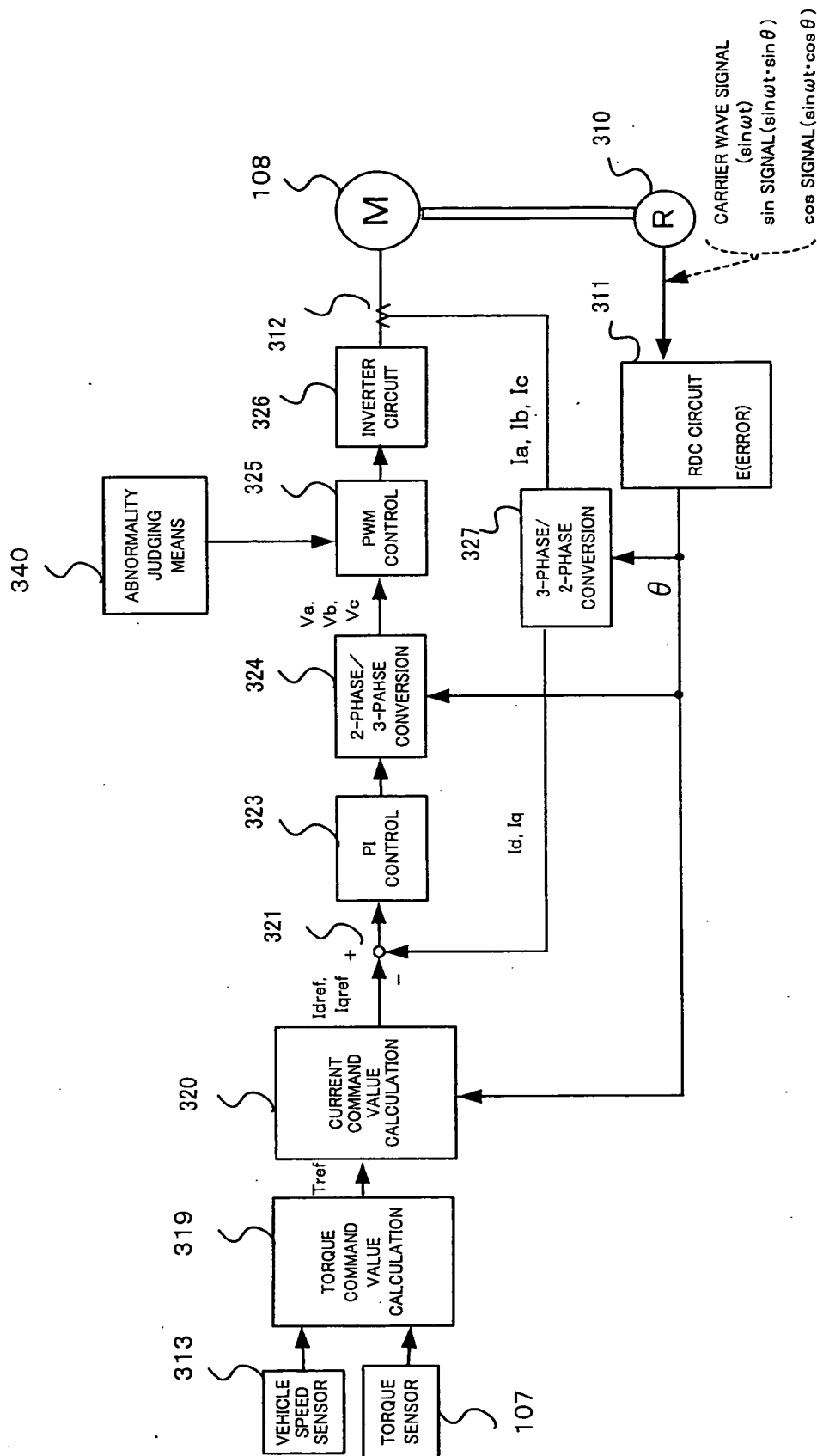


FIG.6

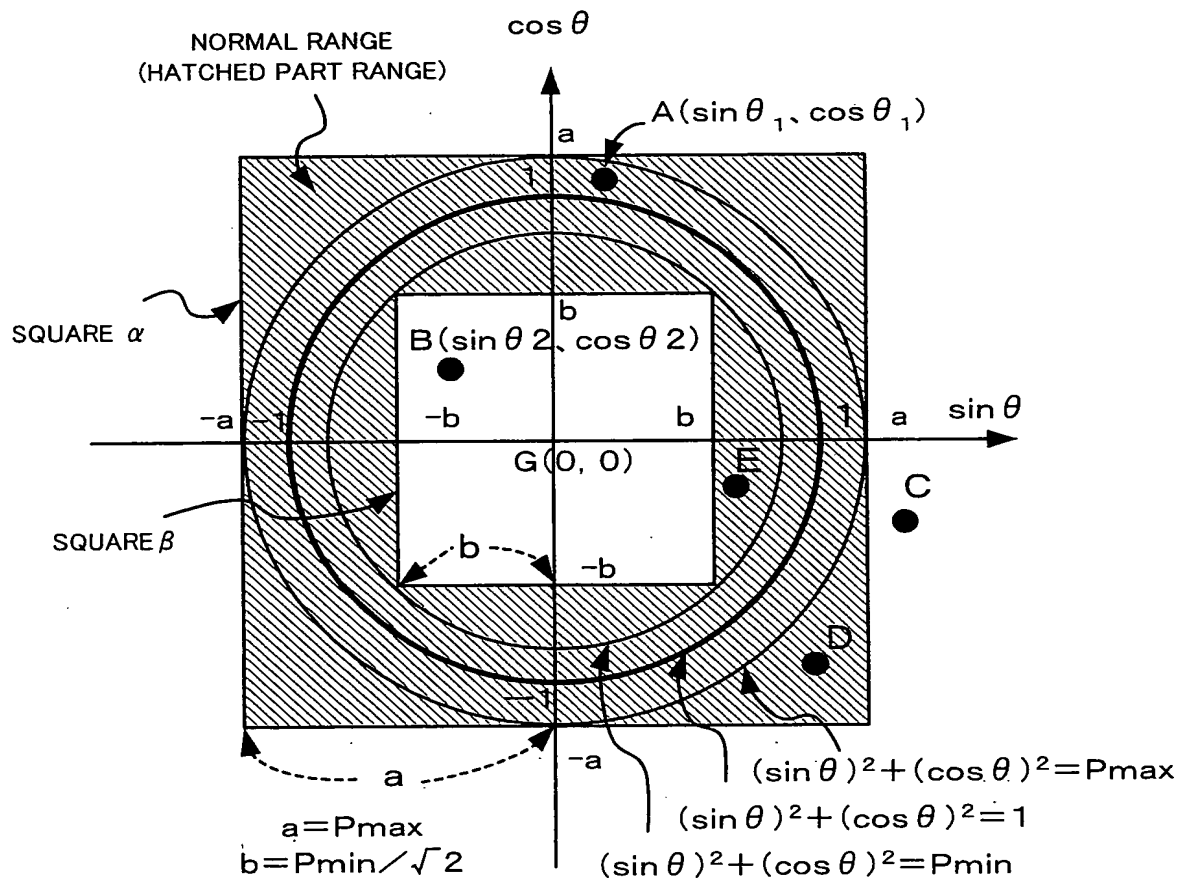


FIG.7

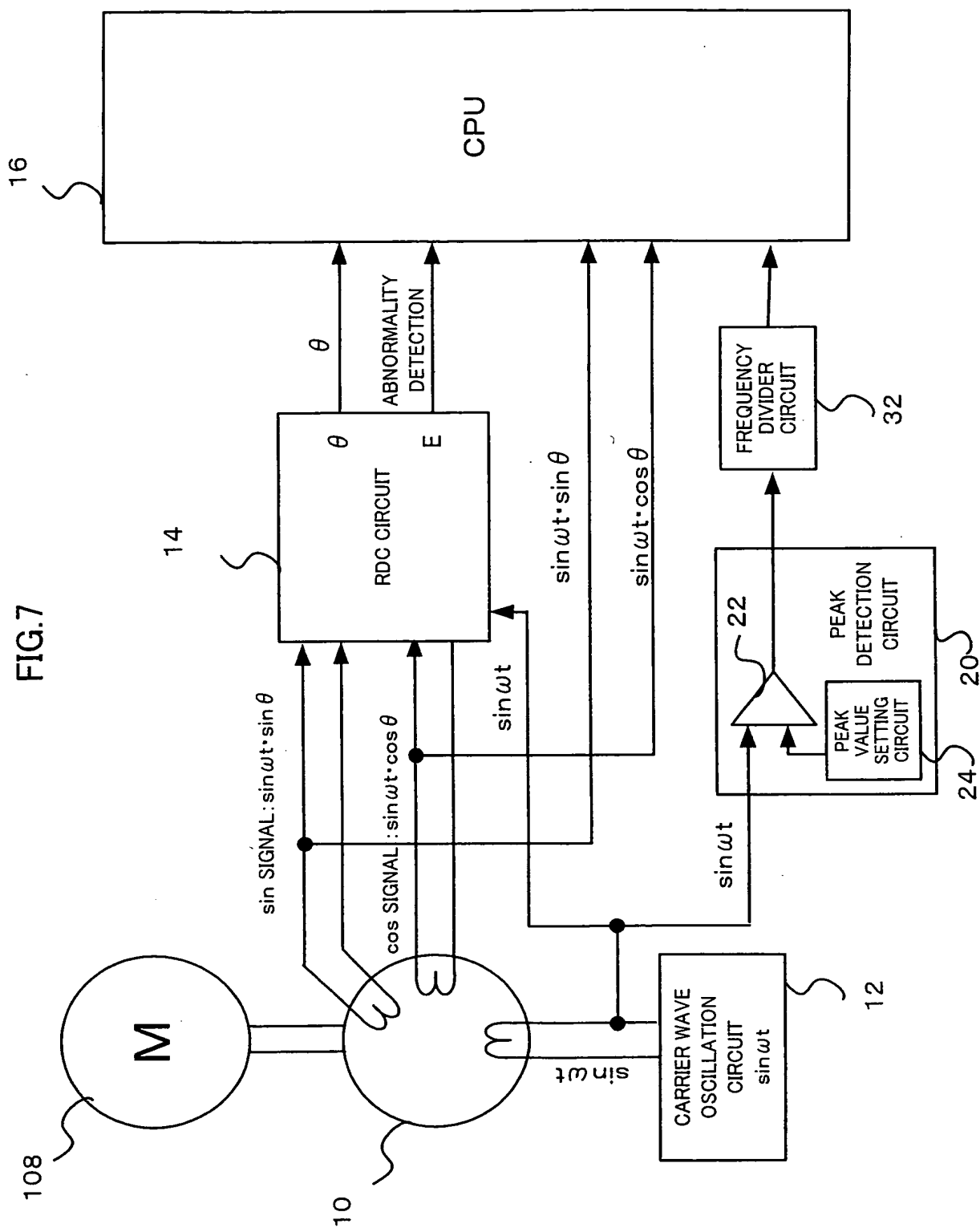


FIG.8

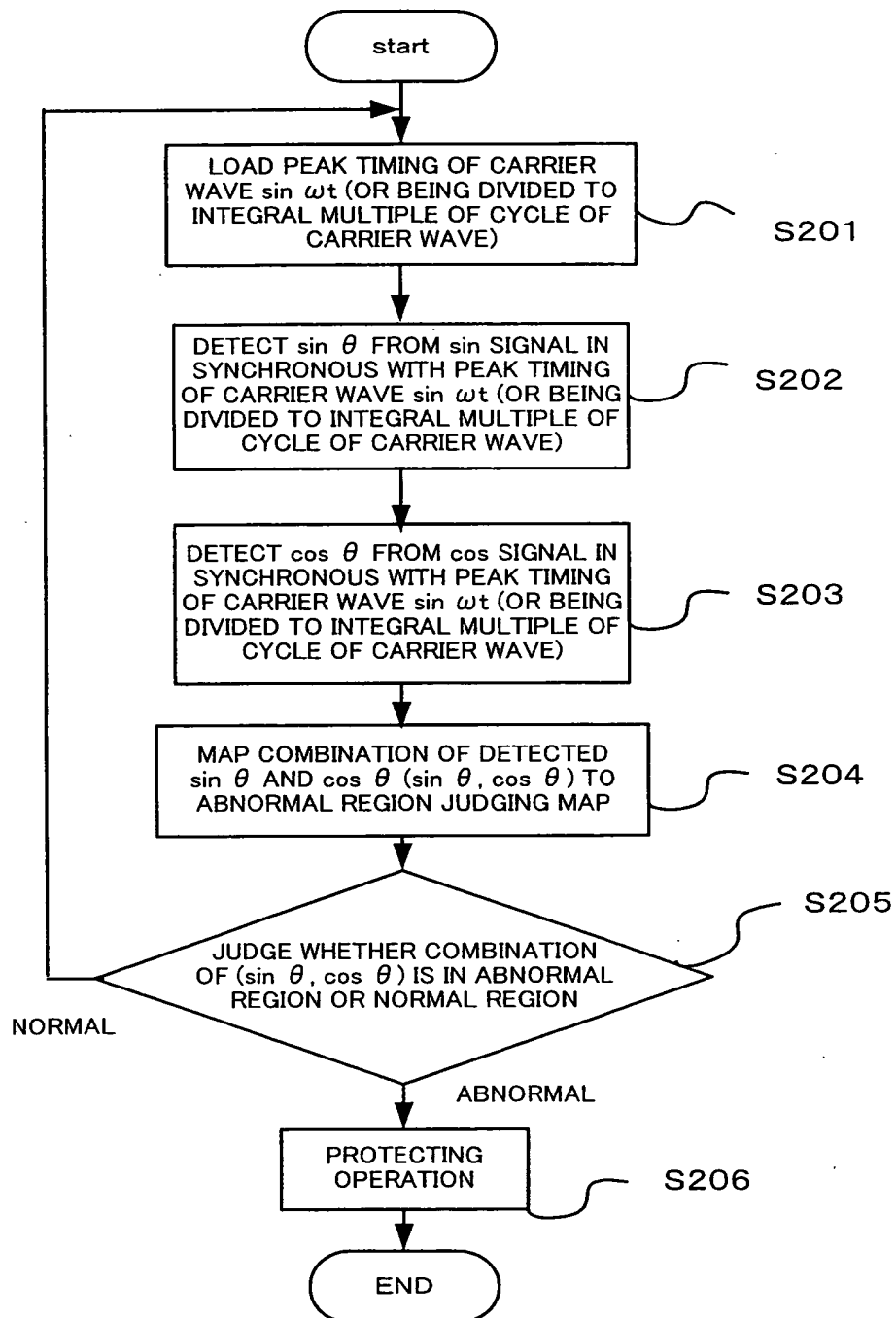


FIG.9

$\frac{\sin \theta}{\cos \theta}$	NO MORE THAN - a	-a~-b	-a~a		a~b	NO LESS THAN b
NO MORE THAN - a	ABNORMAL	ABNORMAL	ABNORMAL	ABNORMAL	ABNORMAL	ABNORMAL
-a~-b	ABNORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ABNORMAL
-a~a	ABNORMAL	NORMAL	ABNORMAL	ABNORMAL	NORMAL	ABNORMAL
	ABNORMAL	NORMAL	ABNORMAL	ABNORMAL	NORMAL	ABNORMAL
a~b	ABNORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ABNORMAL
NO LESS THAN b	ABNORMAL	ABNORMAL	ABNORMAL	ABNORMAL	ABNORMAL	ABNORMAL

FIG.10

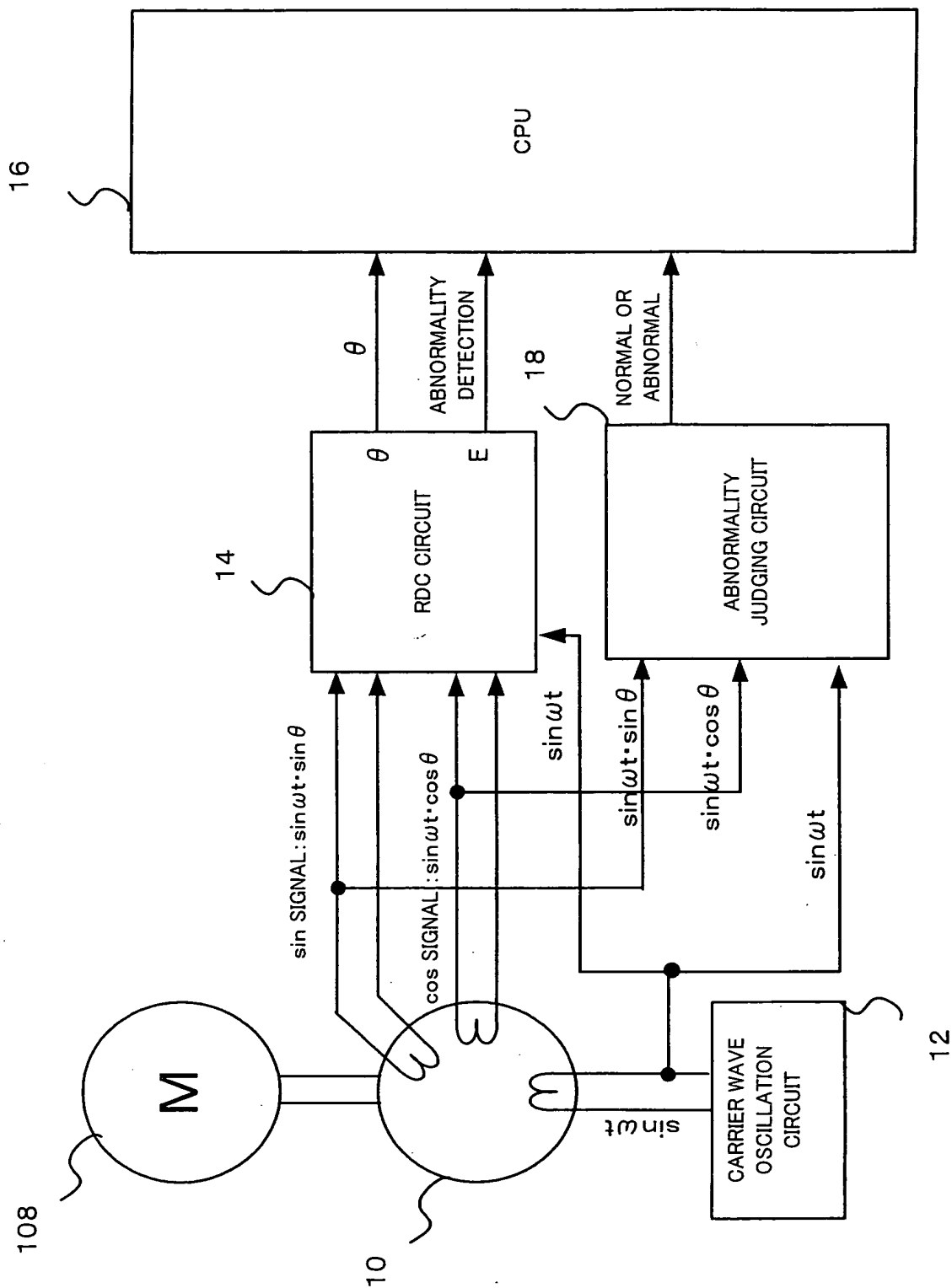


FIG.11

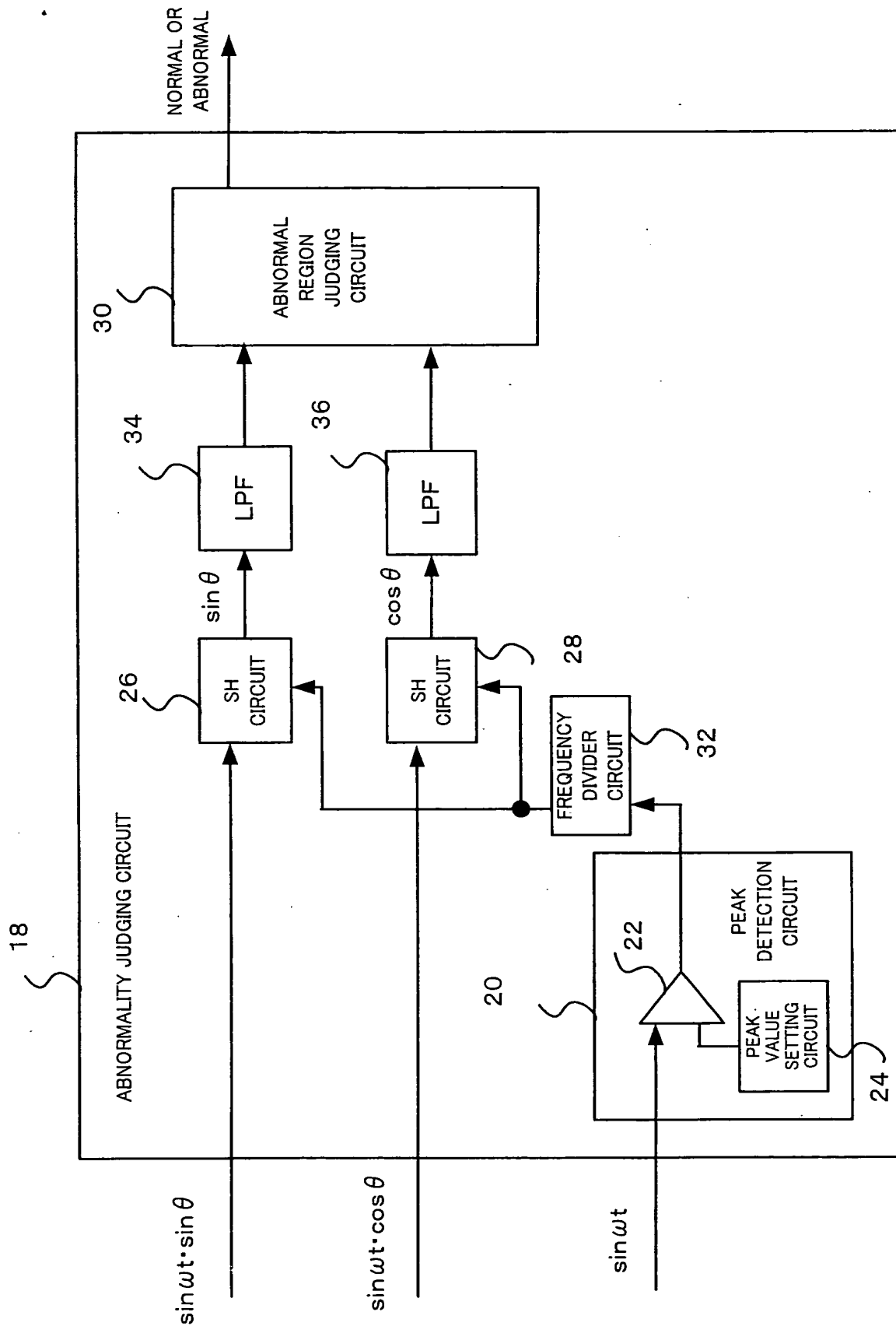


FIG.12

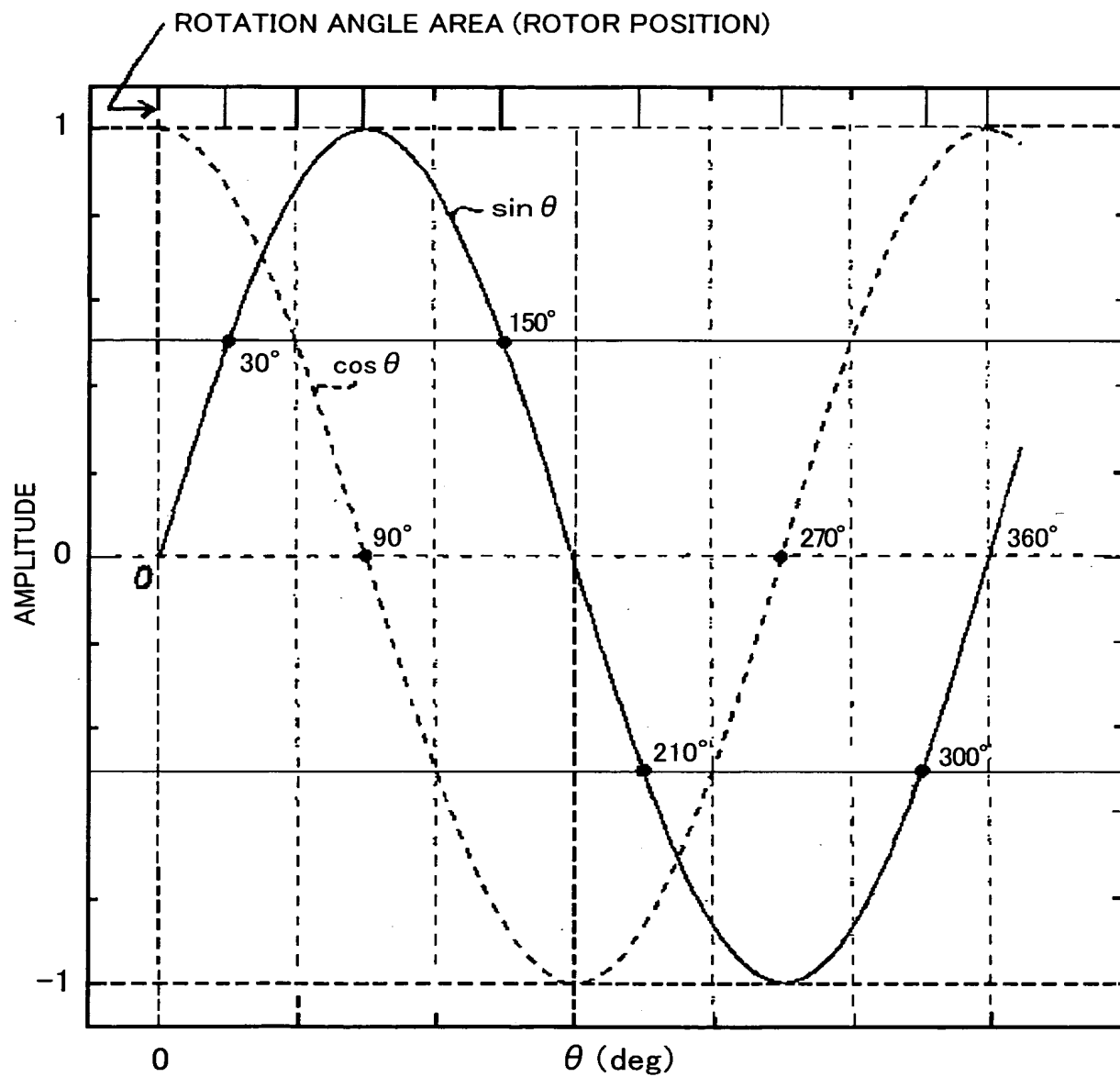


FIG.13

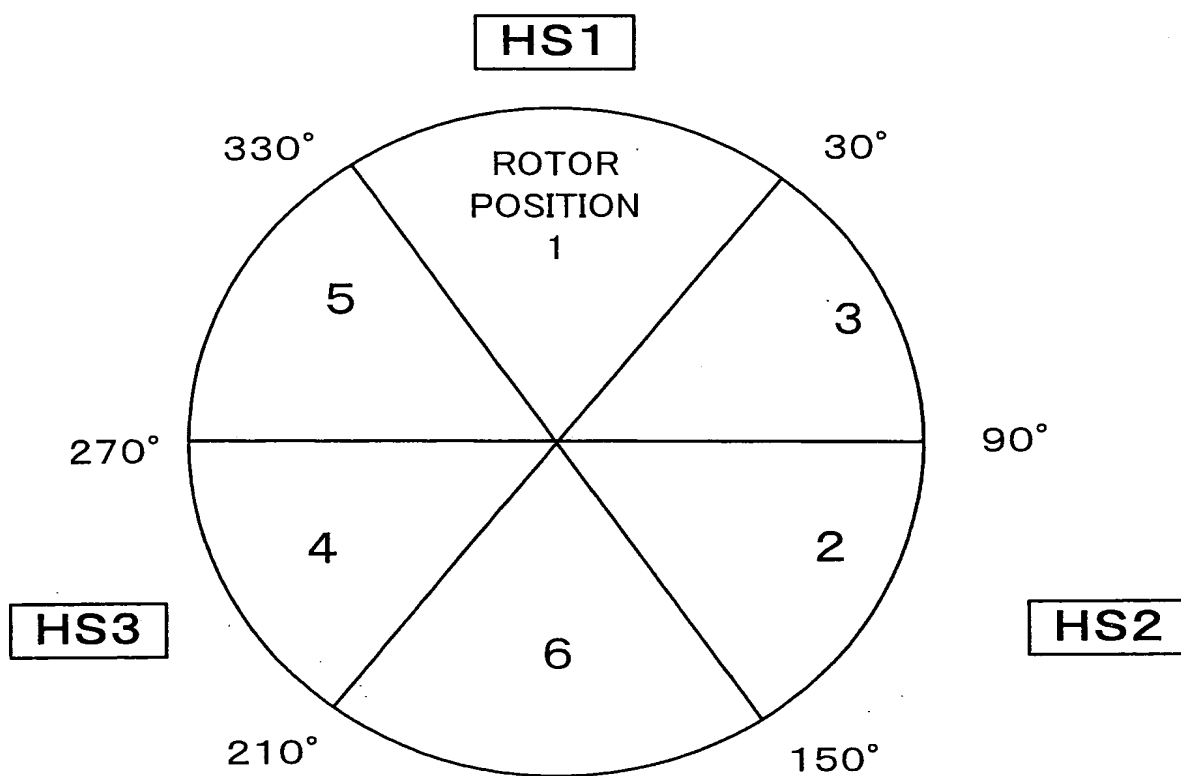


FIG. 14 is a block diagram of a motor control system, divided into two main sections: A (Vector Control) and B (Rectangular Wave Control).

Section A: Vector Control

- Inputs:** A 3-bit signal (corresponding to a hall sensor signal) is provided to the **ANGLE PROCESSING CIRCUIT (AUXILIARY ANGLE PROCESSING CIRCUIT) E (ERROR)** (450-2) and the **ANGLE PROCESSING CIRCUIT (MAIN ANGLE PROCESSING CIRCUIT) E (ERROR)** (311).
- Current Command Calculation:** The **CURRENT COMMAND VALUE CALCULATION** block (452-1) receives I_d and I_q signals from the **3-PHASE/2-PHASE CONVERSION** block (456-1) and a reference current I_{ref} from the **TORQUE COMMAND VALUE CALCULATION** block (319).
- PI Control:** The **PI CONTROL** block (453-1) receives the difference between I_{ref} and the feedback current I_d (via summing junction 453-1) and outputs V_{dref} and V_{qref} to the **2-PHASE/3-PHASE CONVERSION** block (455-1).
- Angle Processing:** The **ANGLE PROCESSING CIRCUIT (AUXILIARY ANGLE PROCESSING CIRCUIT) E (ERROR)** (450-2) receives the 3-bit signal and outputs I_{aref} , I_{bref} , and I_{cref} to the **CURRENT COMMAND VALUE CALCULATION** block (452-2).
- PI Control:** The **PI CONTROL** block (453-2) receives the difference between the reference current and the feedback current (via summing junction 453-2) and outputs V_{aref} , V_{bref} , and V_{cref} to the **2-PHASE/3-PHASE CONVERSION** block (455-2).
- Conversion:** The **2-PHASE/3-PHASE CONVERSION** block (455-1) converts V_{dref} and V_{qref} into three-phase voltage commands V_{aref} , V_{bref} , and V_{cref} .
- Angle Processing:** The **ANGLE PROCESSING CIRCUIT (AUXILIARY ANGLE PROCESSING CIRCUIT) E (ERROR)** (450-2) receives the 3-bit signal and outputs I_{aref} , I_{bref} , and I_{cref} to the **CURRENT COMMAND VALUE CALCULATION** block (452-2).
- PI Control:** The **PI CONTROL** block (453-2) receives the difference between the reference current and the feedback current (via summing junction 453-2) and outputs V_{aref} , V_{bref} , and V_{cref} to the **2-PHASE/3-PHASE CONVERSION** block (455-2).
- Conversion:** The **2-PHASE/3-PHASE CONVERSION** block (455-2) converts V_{dref} and V_{qref} into three-phase voltage commands V_{aref} , V_{bref} , and V_{cref} .

Section B: Rectangular Wave Control

- Angle Processing:** The **ANGLE PROCESSING CIRCUIT (AUXILIARY ANGLE PROCESSING CIRCUIT) E (ERROR)** (450-2) receives the 3-bit signal and outputs I_{aref} , I_{bref} , and I_{cref} to the **CURRENT COMMAND VALUE CALCULATION** block (452-2).
- PI Control:** The **PI CONTROL** block (453-2) receives the difference between the reference current and the feedback current (via summing junction 453-2) and outputs V_{aref} , V_{bref} , and V_{cref} to the **2-PHASE/3-PHASE CONVERSION** block (455-2).
- Conversion:** The **2-PHASE/3-PHASE CONVERSION** block (455-2) converts V_{dref} and V_{qref} into three-phase voltage commands V_{aref} , V_{bref} , and V_{cref} .

Common Components:

- Current Feedback:** The **CURRENT COMMAND VALUE CALCULATION** blocks (452-1 and 452-2) receive feedback signals I_d , I_q , I_a , I_b , and I_c from the **INVERTER CIRCUIT** (326).
- Angle Feedback:** The **ANGLE PROCESSING CIRCUIT (AUXILIARY ANGLE PROCESSING CIRCUIT) E (ERROR)** (450-2) receives the angle θ from the **RDC CIRCUIT** (311).
- Motor:** The **INVERTER CIRCUIT** (326) drives the motor (M) through a resistor (R) and inductor (L) (310).
- Control Signals:** The **INVERTER CIRCUIT** (326) receives PWM control signals (325) and three-phase current commands I_a , I_b , and I_c from the **2-PHASE/3-PHASE CONVERSION** block (455-1).

FIG.15

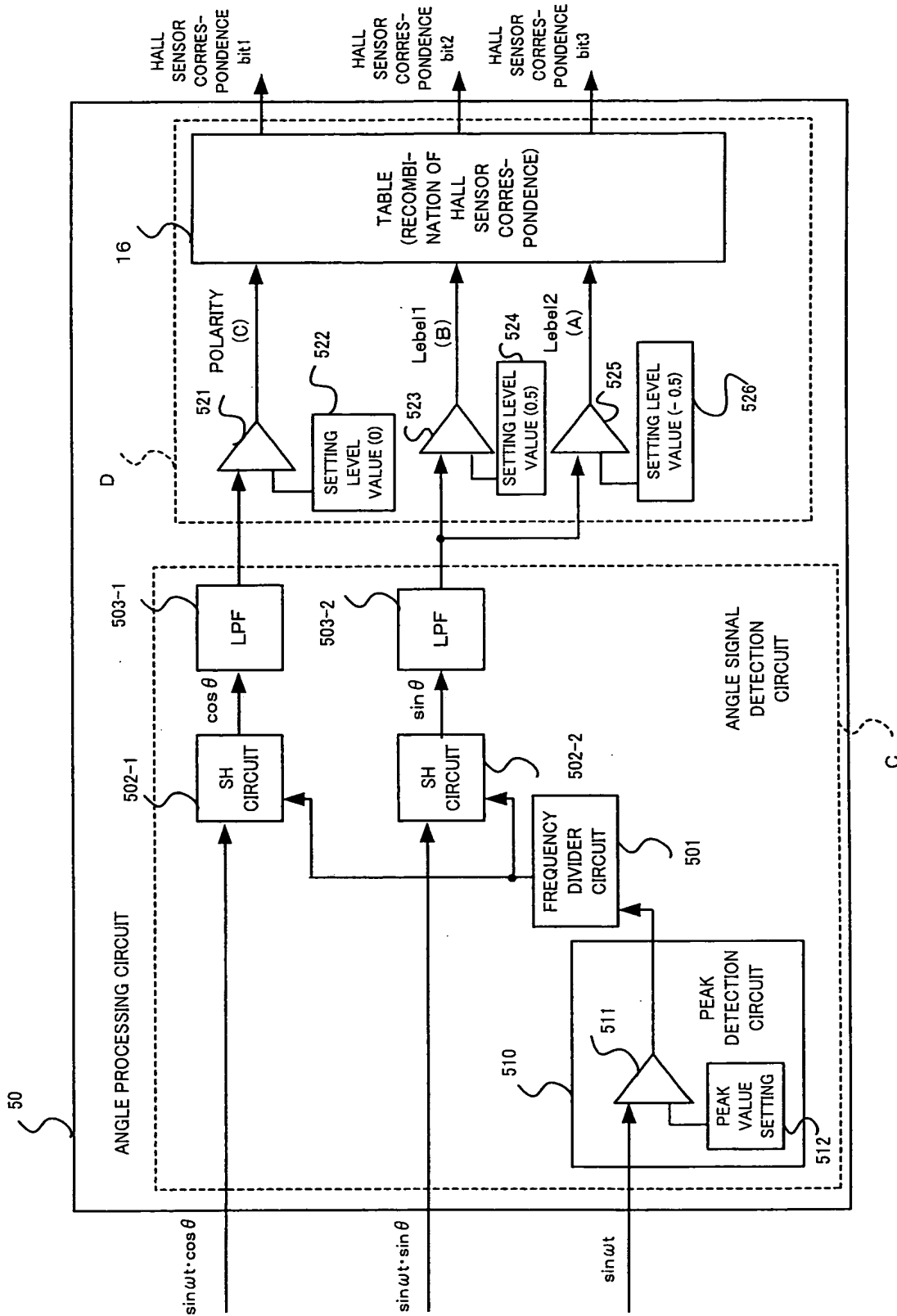


FIG.16

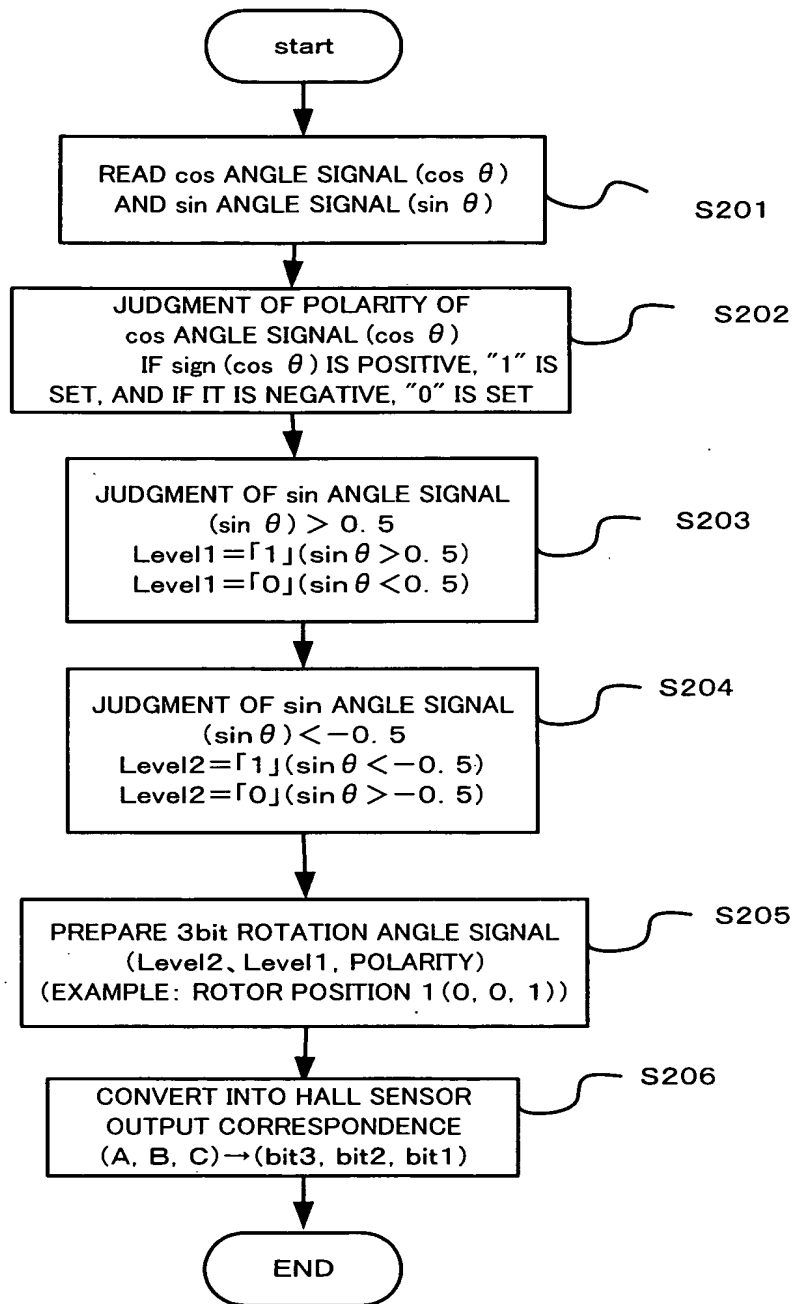


FIG.17

